WHAT IS CLAIMED IS:

1. A method for detecting a refractive index of an analyte, the method comprising:
    a) applying a light source to a fiber optically coupled with a microsphere;
    b) detected light from the fiber;
    c) recording one or more resonance frequencies observed in the detected light;
    d) surrounding the microsphere with the analyte;
    e) applying the light source to the fiber optically coupled with the microsphere;
    f) detected light from the fiber;
    g) recording one or more resonance frequencies observed in the detected light;
    h) determining a change in one or more resonance frequencies; and
    i) determining change in a refractive index using the change in resonant frequency.

2. The method of claim 1 wherein the microsphere is silica.

3. The method of claim 2 wherein a surface of the microsphere is octyl.

4. The method of claim 2 wherein the surface of the microsphere has been treated with octyldimethylchlorosilane.

5. The method of claim 1 wherein the microsphere is polystyrene.

6. The method of claim 1 wherein the microsphere is sapphire.

7. The method of claim 1 wherein a surface of the microsphere has been modified to avoid adsorption of the analyte.

8. The method of claim 1 further comprising:
    j) identifying the analyte using the determined change in refractive index.

9. Apparatus for detecting a refractive index of an analyte, the method comprising:
    a) an optical fiber optically coupled with a microsphere;

b) a light source optically coupled with the optical fiber;

c) a light detector optically coupled with the optical fiber;

d) means for recording one or more resonance frequencies observed in the detected light;

e) means for surrounding the microsphere with the analyte;

f) control means for

i) controlling the light source to apply light to the optical fiber,

ii) controlling the light detector to detected light from the optical fiber, and

iii) controlling the means for recording to recording one or more resonance frequencies observed in the detected light,

both before and after the microsphere is surrounded with the analyte;

g) means for determining a change in one or more resonance frequencies; and

h) means for determining change in a refractive index using the change in resonant frequency.

10. The apparatus of claim 9 wherein the microsphere is silica.

11. The apparatus of claim 10 wherein a surface of the microsphere is octyl.

12. The apparatus of claim 10 wherein the surface of the microsphere has been treated with octyldimethylchlorosilane.

13. The apparatus of claim 9 wherein the microsphere is polystyrene.

14. The apparatus of claim 9 wherein the microsphere is sapphire.

15. The apparatus of claim 9 wherein a surface of the microsphere has been modified to avoid adsorption of the analyte.

16. The apparatus of claim 9 further comprising:

i) means for identifying the analyte using the determined change in refractive index.

17. A method for determining a refractive index profile of an analyte, the method comprising:

a) for each of a plurality of wavelengths,

i) applying a light source at the wavelength to each of a plurality of microspheres and for each of the plurality of microspheres,

A) detecting light, and

B) recording one or more resonant frequencies are recorded;

b) surrounding the microspheres with the analyte;

c) for each of a plurality of wavelengths,

i) applying a light source at the wavelength to each of the plurality of microspheres and for each of the plurality of microspheres,

A) detecting light, and

B) recording one or more resonant frequencies are recorded;

d) determining changes in the resonant frequencies associated with each of a plurality of wavelength, microsphere pairs; and

e) determining a refractive index profile using the changes in the resonant frequencies.

18. The method of claim 17 wherein at least one of the microspheres is silica.

19. The method of claim 18 wherein a surface of the at least one microsphere is octyl.

20. The method of claim 18 wherein the surface of the at least one microsphere has been treated with octyldimethylchlorosilane.

21. The method of claim 17 wherein at least one of the microspheres is polystyrene.

22. The method of claim 17 wherein at least one of the microspheres is sapphire.

23. The method of claim 17 wherein a surface of each of the microspheres has been modified to avoid adsorption of the analyte.

24. The method of claim 17 wherein the plurality of wavelengths include about 980 nm, about 1350 nm, and about 1550 nm.

25. The method of claim 17 further comprising:

f) identifying the analyte using the determined refractive index profile.

26. Apparatus for determining a refractive index profile of an analyte, the apparatus comprising:

a) a plurality of optical fibers, each optically coupled with a microsphere;

b) means for sourcing light at a plurality of wavelengths with the plurality of optical fibers;

c) means for detecting light from the plurality of optical fibers;

d) means for recording one or more resonance frequencies observed in the detected light;

e) means for surrounding the plurality of microspheres with the analyte;

f) control means for

i) controlling the means for sourcing light at a plurality of wavelengths to apply light at a plurality of wavelengths to the plurality of optical fibers,

ii) controlling the means for detecting to light from the plurality of optical fibers, and

iii) controlling the means for recording to recording a profile of one or more resonance frequencies associated with each of a plurality of wavelength, microsphere pairs,

both before and after the plurality of microspheres is surrounded with the analyte;

d) determining changes in the resonant frequencies associated with each of a plurality of wavelength, microsphere pairs; and

e) means for determining a refractive index profile using the changes in the resonant frequencies associated with the plurality of wavelength, microsphere pairs.

27. The apparatus of claim 26 wherein at least one of the microspheres is silica.

28. The apparatus of claim 27 wherein a surface of the at least one microsphere is octyl.

29. The apparatus of claim 27 wherein the surface of the at least one microsphere has been treated with octyldimethylchlorosilane.

30. The apparatus of claim 26 wherein at least one of the microspheres is polystyrene.

31. The apparatus of claim 26 wherein at least one of the microspheres is sapphire.

32. The apparatus of claim 26 wherein a surface of each of the microspheres has been modified to avoid adsorption of the analyte.

33. The apparatus of claim 26 wherein the plurality of wavelengths include about 980 nm, about 1350 nm, and about 1550 nm.

34. The apparatus of claim 26 further comprising:

f) means for identifying the analyte using the determined refractive index profile.